CLAIMS

What is claimed is:

1. A semiconductor laser device, comprising:
   a waveguide having separate first order reflector gratings at both ends of said waveguide;
   an outcoupling location positioned between said gratings on said waveguide, connected to couple light out of said waveguide.

2. The device of Claim 1, wherein said gratings are distributed Bragg reflectors.

3. The device of Claim 1, wherein said light is coupled out at an angle other than the normal to the surface of said device.

4. The device of Claim 1, wherein said outcoupling location comprises a first order grating which couples light out of said waveguide.

5. The device of Claim 1, further comprising a reflective surface positioned atop the device at said outcoupling aperture to reflect light downward through the bottom of said device.

6. The device of Claim 1, wherein said outcoupling location comprises a holographic optical element.

7. A semiconductor laser device, comprising:

a waveguide structure having first and second reflectors, one at either end of said waveguide;

a first set of electrodes connected to pump a first gain region portion of said waveguide structure adjacent to said first reflector;

a second set of electrodes connected to pump a second gain region portion of said waveguide structure adjacent to said second reflector;

an outcoupling aperture positioned between said first and second gain region portions on said waveguide structure, connected to couple light out of said waveguide structure.

8. The device of Claim 7, wherein at least one of said reflectors is a facet with a reflective coating.

9. The device of Claim 7, wherein said first set of electrodes comprises two parts, one of said parts being used to modulate said device.

10. The device of Claim 7, wherein said outcoupling aperture comprises a first order grating with a non-circular footprint.

11. The device of Claim 7, wherein said outcoupling aperture is matched to the mode of a fiber waveguide.

12. The device of Claim 7, wherein said outcoupling aperture comprises a grating having a layer of material thereon, said layer limiting the number of photons exiting said aperture.

13. The device of Claim 7, wherein said device is integrated with other optical elements on a single semiconductor substrate.

14. A semiconductor laser device, comprising:
a cavity having reflectors at either end and an outcoupling aperture connected to outcouple light from said cavity;
a gain region of said cavity located between said reflectors, said gain region having a first portion on one side of said outcoupling aperture and a second portion on the opposite side of said outcoupling aperture.

15. The device of Claim 14, wherein said first portion of said gain region has two parts, one of said parts being used to modulate said device.

16. The device of Claim 14, wherein said outcoupling aperture comprises a beam splitter which outcouples light by reflecting it in a direction perpendicular to the surface of said device.

17. The device of Claim 14, further comprising a dielectric coating on said outcoupling aperture, said coating reducing the number of photons exiting said outcoupling aperture.

18. The device of Claim 14, further comprising a reflective layer on said outcoupling aperture which reflects light downward through the bottom of said device.

19. The device of Claim 14, wherein said outcoupling aperture comprises a grating with a circular footprint.

20. The device of Claim 14, wherein said reflectors are distributed Bragg reflectors each having a grating strength, and wherein said grating strength for at least one of said reflectors varies laterally and longitudinally with respect to said cavity.

21. A semiconductor laser system, comprising:
a cavity having reflectors at either end and an outcoupling aperture connected to outcouple light from said cavity, said outcoupling aperture located between said reflectors;
a gain region of said cavity located between said reflectors;
a reflective layer positioned on said outcoupling aperture.

22. The system of Claim 21, wherein said gain region has multiple parts, one of which has a variable current for modulating the output light.

23. The system of Claim 21, wherein said reflective layer reflects light downward through the bottom of said cavity.

24. The system of Claim 21, wherein said gain region has multiple parts, one of which has a variable current for tuning the wavelength of the output light.

25. The system of Claim 21, wherein light is coupled out of the laser normal to the surface of the laser.

26. The system of Claim 21, wherein said system is integrated on a single semiconductor substrate with other optical elements.

27. A semiconductor laser system, comprising:

a cavity having reflectors at either end and an outcoupling aperture connected to outcouple light from said cavity, said outcoupling aperture located between said reflectors;

a gain region of said cavity located between said reflectors;

wherein said gain region is divided into a plurality of sections, one of said sections being connected to modulate said light.

28. The system of Claim 27, wherein at least one of said reflectors is a distributed Bragg reflector.

29. The system of Claim 27, wherein said outcoupling aperture comprises a grating which couples light out of the laser at an angle other than normal to the surface of said laser.